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ABSTRACT

This study was designed to select and explore a research battery which, when administered at the beginning of the school year, more adequately and efficiently predicts end-of-year reading achievement than have previously used tests and test batteries. The most powerful predictor tests were designed to provide a more adequate screening device than is currently available for the use of classroom teachers in grouping for reading instruction. A second major purpose of this study was to explore the relative contributions of perceptual-motor and cognitive intellectual ability measures at the first and third grade levels of reading instruction in order to suggest guidelines for instructional emphasis in teaching reading skills. Two hundred and four first grade students and 202 third grade students were divided into validation groups and tested with various combinations of perceptual-motor tests and cognitive-intellectual tests at the beginning of the year. Their scores were correlated with their reading achievement scores at the end of the year with the higher correlations indicating the more effective batteries. Results indicate that perceptual motor tests were better predictors of reading achievement scores for first grade children while cognitive-intellectual tests were better for third graders. (DJ)

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Objectives of the Study

This study was designed to select and explore a research battery which, when administered at the beginning of the school year, more adequately and efficiently predicts end-of-year reading achievement than have previously used tests and test batteries. The most powerful predictor tests were designed to provide a more adequate screening device than is currently available for the use of classroom teachers in grouping for reading instruction. A second major purpose of this study was to explore the relative contributions of perceptual-motor and cognitive-intellectual ability measures at the first- and third-grade levels of reading instruction in order to suggest guidelines for instructional emphasis in teaching reading skills.

Statement of the Problem

It is clear that an important, early step in a systematic effort by the school psychologist to reduce the magnitude of reading difficulties among primary grade pupils is to develop more valid methods for the early prediction and identification of those children who may not be expected to make satisfactory progress in reading achievement. Smith and Keogh (1962) stated that, "The need for accurate early identification of potential reading problems and the optimal placement of children in a beginning reading program has been increasingly recognized (p.639)." While the use of group tests as predictive devices for reading achievement has received much attention in the research literature (MacGinitie, 1969, P. 403; T. Harris, 1969, P. 1088), results have been, thus far, only suggestive and

insufficient in helping teachers to plan individual reading instruction programs (Barrett, 1965, p. 281; Livo, 1970, pp. 124-125). There is a continuing need to explore and try out test measures with the purpose of selecting a relatively brief, group-administered, and more powerful predictive device (most adequate predictor tests) for use with pupils of primary grade levels than is currently available (MacGinitie, 1969, pp. 402-403; Farr, 1969, p. 158). The adoption and use of a screening device for specific populations may serve as an objective criterion for placement into reading groups which best coincide with each pupil's ability and rate of development.

Hypotheses Investigated

Hypotheses were related to the significant prediction of end-of-year reading achievement test scores using the Gates-MacGinitie Reading Tests, Primary A for first grade, and Primary C for third grade, respectively, as the criterion measures. Other hypotheses investigated empirically were that perceptual-motor abilities are significantly related to reading achievement at the first-grade level, which cognitive-intellectual abilities become more important at the third-grade level.

Procedures

Research Battery

The research battery was composed of perceptual-motor tests (visual, auditory and auditory-visual integration tasks) and cognitive-intellectual tests (abstract reasoning, oral comprehension, concept formation tasks). Tests of the research battery at the first-grade level included six group-administered measures. They were: (1) Developmental Test of Visual Perception (Frostig, 1964); (2) Bender-Gestalt Test (Koppitz, 1964); (3) Audi-

tory-Visual Pattern Test (Birch & Belmont, 1968 rev.); (4) Murphy-Durrell Reading Readiness Analysis, Phonemes Test (Part I and Part II) and Letter Names Test (Part I and Part II), (Murphy and Durrell, 1965); (5) Otis-Lennon Mental Ability Test, Primary II level, Form J, for first grade and Elementary I level, Form J, for third grade, (Otis and Lennon, 1967); and (6) Durrell-Sullivan Reading Capacity Test, Intermediate Test, Form A (Durrell and Sullivan, 1965). (The number of items administered on this test differed for the first- and third-grade levels.) At the third-grade level, the research battery was identical except for the elimination of the Murphy-Durrell Reading Readiness Analysis, which was judged too easy to make a significant contribution towards predicting end-of-year reading achievement. The Perceptual-Motor Tests are tests (1) through (4), and the Cognitive-Intellectual Tests are tests (5) and (6), respectively.

Sample

The final sample consisted of 204 subjects at the first-grade level (98 boys and 106 girls) and 202 subjects at the third-grade level (104 boys and 98 girls), respectively. Subjects received the tests of the research battery and the criterion test, and were taught reading with basal instruction series (Scott-Foresman). The sample for each grade and sex group subsequently was subdivided in the ratio of 2:1, and became the validation and cross-validation groups, respectively. (Teachers were not informed of the test results in order to control for, as much as possible, special teaching effects with individual children.)

Methods

Multiple correlation/regression procedures were used to select the most powerful combination of predictor tests for forecasting end-of-year reading achievement for each grade and sex group, using the data of the

validation subsamples. Tests of significance were employed to obtain optimal prediction equations which met the objectives of parsimony and adequacy as a screening technique. Partial correlation and multiple-partial correlation procedures were utilized to assess the relative contributions of perceptual-motor and cognitive-intellectual ability measures to first- and third-grade reading achievement. Cross-validation procedures were employed to assess the accuracy with which the optimal prediction equations could be used with confidence for new samples from the same population.

Results and Conclusions

1. R's of .68 and .66 were obtained using a combination of the Murphy-Durrell Letter Names Test and the Auditory-Visual Pattern Test for predicting Vocabulary and Comprehension scores, respectively, of first-grade boys on the Gates-MacGinitie Reading Tests. The optimal prediction equations for this group were as follows:

   (Voc.) (1) $\hat{Y}_1 = 16.258 + .398$ M-D L.N. $+ .552$ A-V-I

   (Comp.) (2) $\hat{Y}_2 = 6.215 + .292$ M.D L.N. $+ .433$ A-V-I

2. R's of .78 and .80 were obtained using a combination of the Murphy-Durrell Letter Names Test, the Otis-Lennon Mental Ability Test, and the Frostig test for predicting Vocabulary and Comprehension scores, respectively, of first-grade girls. These levels of predictive effectiveness exceeded those reported by use of other tests and test batteries in previous studies using more tests. The optimal prediction equations for this group were as follows:

   (Voc.) (3) $\hat{Y}_1 = 12.251 + .192$ M-D L.N. $+ .315$ O-L $+$ $.179$ Frostig

(Comp.) (4) $\hat{Y}_2 = 3.385 + .181$ M-D L.N. $+ .186$ Frostig $.185$ O-L

3. R's of .32 and .18 (not significant at .05 level) were obtained using the Otis-Lennon Mental Ability Test for predicting Vocabulary scores and the Durrell-Sullivan Reading Capacity Test (total) for predicting Comprehension scores, respectively, of third-grade boys. Therefore, the use of the resulting prediction equations for this group was not advisable.

4. An R of .63 was obtained using a combination of the Otis-Lennon Mental Ability Test and the Durrell-Sullivan Reading Capacity Test (total) for predicting Vocabulary scores of third-grade girls. The optimal prediction equation for this group was as follows:

(Voc.) (7) $\hat{Y}_1 = 16.291 + .218$ O-L $+ .218$ (DSCT-T)

5. An R of .70 was obtained using a combination of the Otis-Lennon Mental Ability Test and the Auditory-Visual Pattern Test for predicting Comprehension scores of third-grade girls. The optimal prediction equation for this group was as follows:

(Comp.) (8) $\hat{Y}_2 = 3.064 + .368$ O-L $+ .778$ A-V-I

6. Perceptual-motor tests accounted for more of the explained variation in reading achievement scores (Vocabulary and Comprehension) than did cognitive-intellectual tests for first-grade boys and girls.

7. Cognitive-intellectual tests accounted for more of the explained variation in reading achievement scores (Vocabulary and Comprehension) than did perceptual-motor tests for third-

grade boys and girls.

8. The prediction equations derived in this study may be used as reliable, relatively brief, screening techniques for predicting end-of-year reading achievement for new samples of first- and third-grade pupils from the same population.

Implications

The prediction equations derived in this study may serve as a guide for grouping in reading instruction. Children for whom the equations forecast considerably above average reading achievement may be placed in accelerated reading groups where they can proceed at a level commensurate with their abilities. Children for whom the equations forecast considerably below average reading achievement may be identified early in the school year for further diagnostic study and more individualized instruction. Such children may be placed in reading groups which provide them an opportunity for instruction at a slower, more deliberate pace than children for whom the prediction equations forecast approximately average levels of reading achievement. It is emphasized, however, that prediction equations may be used as guides for placement; but they should not be used for rigid or permanent classification of pupils' reading abilities nor for prejudicing teachers' judgments about pupils' future performances.

The use of prediction equations may also provide guidelines for instructional emphasis in reading. Evaluation of component abilities (perceptual-motor and cognitive-intellectual) which appear important in predicting reading achievement for specified grade and sex groups suggests types of skills which are most appropriate at that level of reading development. For example, a teacher would not wish to emphasize cognitive-intellectual skills such as drawing inferences, making judgments, and compre-

hending levels of meaning in reading when pupils have not learned the basic perceptual skills necessary for letter and word recognition. Such a misjudgment could result in subsequent frustration and possible reading failure. Similarly, teachers would wish to gear their instruction to building cognitive-intellectual skills once they have evidence that the basic word recognition skills have been mastered. Empirical support for emphasizing selected reading skills for individual pupils at primary grade levels may help to improve learning efficiency. Such considerations become increasingly important in continuous progress reading programs where pupils follow consecutive and developmental units of instruction. The judicious use of valid and reliable prediction equations as a guide for grouping in reading, for early identification of potential reading problems, and for instructional emphasis in reading offers promise as a systematic step in reducing the magnitude of the "reading problem" in this country.

It is important to deal with the ever-increasing demands upon the time of too few psychologists and other pupil services personnel in the schools. Since large numbers of pupil referrals to school psychologists from teachers at primary grade levels concern reading problems, the development of valid and reliable prediction equations for classroom use may help to satisfy these needs. The utilization of group-administered, screening techniques (the most powerful combination of predictor tests) for forecasting end-of-year reading achievement scores may help in identifying and selecting at an early age those pupils for whom special pupils services may be most effective. This, then, would be a valuable contribution by the school psychologist who makes available valid prediction equations and their interpretation for classroom use.

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